

In situ observations of PSCs generated by gravity waves

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Polar Stratospheric Clouds (PSCs) are potential sites for chemical reactions which can locally deplete ozone within the arctic stratosphere. Gravity waves which propagate upward from the troposphere can provide the forcing necessary to cause PSC formation, and increase vertical motions and cooling rates within these clouds. Rapid small scale motions within PSCs may simply be random vertical motions of buoyant air parcels. Alternately, they may indicate turbulent gravity wave breaking, which can cause irreversible mixing and displacement of chemical species from equilibrium levels. Meteorological Measurement System (MMS) data collected on the NASA ER-2 during the SOLVE campaign is presented, showing examples of gravity wave encounters with PSCs. Microscale, turbulence-like features in the MMS wind and temperature fields are interpreted, and their influence on the chemical concentrations within PSCs are evaluated and discussed.